Manager Performance and the Diversity Cycle

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The S&P 500 Index is frequently used as a benchmark for equity managers' performance. Some years active equity managers do well against this benchmark, and some years they don't. From about 1990 to 1993, active managers generally did well against the S&P 500, and it was even suggested that equity indexing might disappear. However, from 1994 to 1998 active managers have, on average, performed quite badly versus the benchmark, and now it is suggested that the managers will disappear. But despite the poor performance, this might not be the best moment to move all your equities to a cap-weighted index fund.

The concept of market *diversity* was introduced through research carried out at INTECH over the past few years. Diversity is a measure of the spread of capital across an equity market or index. Diversity is higher when capital is spread more evenly among the stocks in the index, and is lower when capital is more concentrated among a few large stocks. Changes in diversity measure the ebb and flow of capital between the larger and smaller stocks. Diversity decreases when capital flows into the larger stocks, resulting in more concentration of capital in fewer stocks. Diversity increases when capital ebbs back into the smaller stocks, resulting in a less concentrated distribution of capital.

Figure 1 shows the variation in market diversity over the period from 1927 to 1998, calculated using data from the Center for Research in Securities Prices at the University of Chicago. As can be seen from the chart, diversity is variable over the short term, but has been mean-reverting over the long term. The low points on the diversity curve, indicating extreme concentration of capital in the large stocks, occurred during the Great Depression in 1932, the "Nifty Fifty" era in 1974, and now. It would seem unlikely that diversity would indefinitely continue to trend downwards, for this would result in the concentration of almost all the capital into a few companies. Hence, diversity is likely to continue its cycle, increasing over some periods and decreasing over others.

In Figure 2, annual relative manager performance from 1971 to 1998 is plotted versus the annual changes in market diversity, with each of the data points represented by the corresponding year. The y-axis is the annual (logarithmic) return of the median equity manager relative to the S&P 500, calculated using data from the Domestic Equity Database of Callan Associates. The x-axis is the annual change in market diversity, the same market diversity as in Figure 1. The diagonal line is the least-squares regression line for the data. Analysis of the regression indicates that slightly more than half of the annual variation in relative manager performance can be explained by the change in market diversity. This means that there can be no other variable independent of the change in market diversity that explains as much of the annual variation. It is well-known that managers are reluctant to concentrate as much capital in the largest stocks as occurs in the cap-weighted S&P 500, and this causes their returns to be correlated with the change in diversity. (The correlation is about 72%.)

From Figure 2 we see that 1998 was not a good year for active managers (see lower left). However, we also see that the 1998 data point is not far from the regression line, so most of the manager underperformance in 1998 can be explained by the change in market diversity that year. Now, Figure 1 shows that diversity has declined significantly over the last few years, and if it is mean-reverting, then it is likely to start to move back up at some point. If the relationship between managers' relative performance and change in diversity continues to hold in the future, then the managers' relative performance is likely to improve. Hence, this might not be the best time to move to a cap-weighted large-stock index.

However, there are other alternatives for those who feel they must index. One alternative would be to choose a broader index such as the Wilshire 5000 Index. The small stocks included in this index should help its performance relative to the S&P 500 during periods in which diversity is increasing. Unfortunately, the Wilshire 5000 contains so many small stocks that it is virtually impossible to manage as a simple cap-weighted index. Instead, various sampling techniques are usually used, and the performance of the resulting portfolio will depend on the efficacy of these techniques. But these difficulties are not present in a new type of indexing strategy that has recently been developed.

Diversity-weighted indexing is a new form of passive equity strategy for large-stock indices that

benefits from increasing diversity, but is not burdened by large numbers of small stocks. Diversity weighting resulted from the research on market diversity conducted by INTECH, and has been used for managing actual equity portfolios since 1996 (see R. Fernholz, R. Garvy, and J. Hannon. "Diversity-Weighted Indexing." *Journal of Portfolio Management*, Winter 1998, pp. 74–82). A diversity-weighted S&P 500 index is slightly less exposed to the larger stocks than the standard cap-weighted S&P. This means that the diversity-weighted index is likely to underperform the cap-weighted index in times of decreasing diversity, and will outperform in times of increasing diversity. But the key attraction to diversity-weighted indexing not its sensitivity to changes in diversity, but rather that over any period in which the S&P 500 diversity does not change, i.e., begins and ends the period at the same level, the diversity-weighted S&P 500 can be expected to outperform the cap-weighted S&P 500 by about 40 to 50 basis points a year. Hence, if the diversity of the S&P 500 Index is mean-reverting, over the long term the change in diversity will be essentially flat, and the diversity-weighted version of the index will outperform the cap-weighted version.

The diversity-weighted S&P 500 has about 14% turnover a year, comparable to other passive strategies, and holds the same stocks as the S&P 500 Index. The simulation data in Table 1 show that the diversity-weighted S&P 500 would have outperformed the Wilshire 5000 since the inception of that index in 1971. Nevertheless, although diversity weighting has significant advantages over cap weighting in the current market environment, investors steadfastly remain with cap weighting. One reason for this is that diversity weighting is a new idea, and not many investors are aware of its benefits yet. But perhaps the most important reason is that cap weighting enjoys the status of "safe harbor" for passive equity investment. If diversity-weighted indexing were the safe harbor, what possible rationale could there be to move to cap weighting under current market conditions?

In conclusion, Figure 1 shows that market diversity has been mean-reverting over the past 72 years, and that we have recently experienced the greatest contraction of diversity since before the Great Depression. Figure 2 shows that over the past 28 years there has been a relationship between changes in diversity and relative manager performance. If diversity reverts back to the mean, then relative manager performance is likely to improve. But even investors who feel they have to "go passive" should be aware that they might benefit from diversity weighting rather than cap weighting for their passive strategy.

	Average Annual Return	Annual Std. Dev.	Sharpe Ratio
Diversity-Weighted S&P 500	15.43%	16.44%	.51
Wilshire 5000	14.99%	16.89%	.47

Table 1: Simulated performance statistics from 1971 to 1998

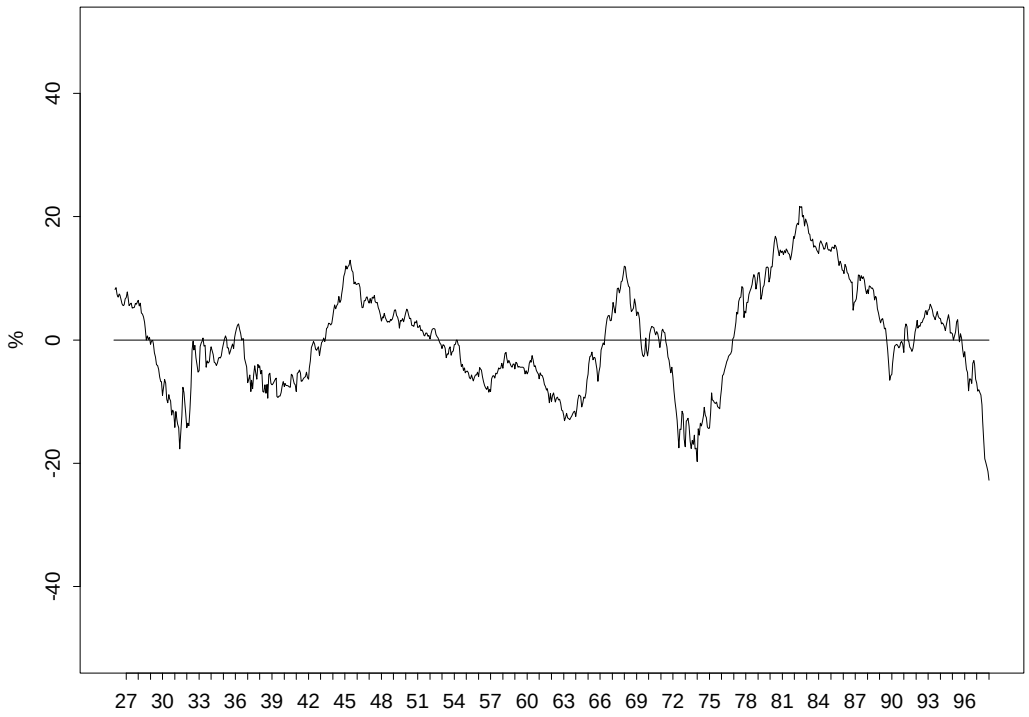

Figure 1: Variation in Market Diversity, 1927–1998

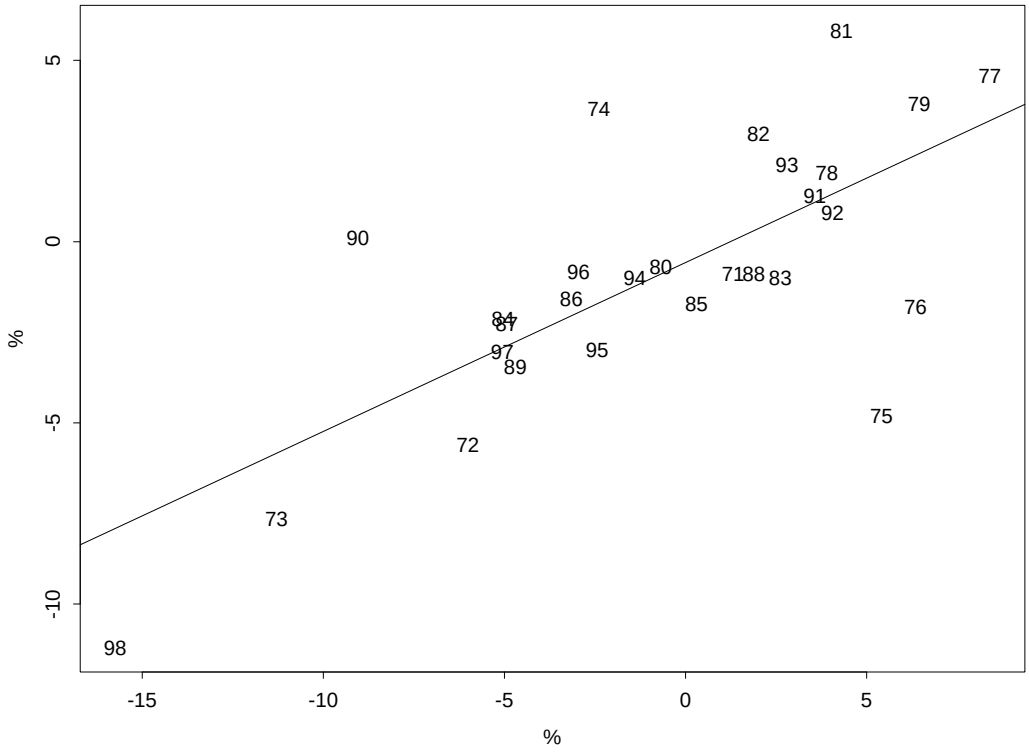

Figure 2: Relative Manager Performance vs. Change in Diversity, 1971–1998